UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/549,886	09/13/2006	Torsten Muller	B1180/20044	7569

3000 7590 03/02/2010

CAESAR, RIVISE, BERNSTEIN,
COHEN & POKOTILOW, LTD.
11TH FLOOR, SEVEN PENN CENTER
1635 MARKET STREET
PHILADELPHIA, PA 19103-2212

EXAMINER	
KAUR, GURPREET	
ART UNIT	**PAPER NUMBER**
1795	

NOTIFICATION DATE	DELIVERY MODE
03/02/2010	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patents@crbcp.com

Office Action Summary	Application No.	Applicant(s)	
	10/549,886	MULLER ET AL.	
	Examiner	Art Unit	
	GURPREET KAUR	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 November 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3 and 5-33* is/are pending in the application.

4a) Of the above claim(s) *21-33* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3 and 5-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Claims 1-3 and 5-33 are pending.

Claim 4 is cancelled and claims 21-33 are withdrawn.

Claims 1-3 and 5-20 are being examined.

Election/Restrictions

2. Applicant's election without traverse of claims 1-3 and 5-20 in the reply filed on 11/17/2009 is acknowledged.

Response to Arguments

3. Applicant's amendment of 11/17/2009 does not render the application allowable.

Rejection from the previous office action is maintained.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-3, 6-17, 19 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benecke et al. (U.S. Pat. No. 5,454,472).

Regarding claim 1, Benecke et al. teaches a method for separating particles (1, 2) in a compartment (chamber 10) of a microfluidic system (see col. 1, lines 11-15) comprising the steps:

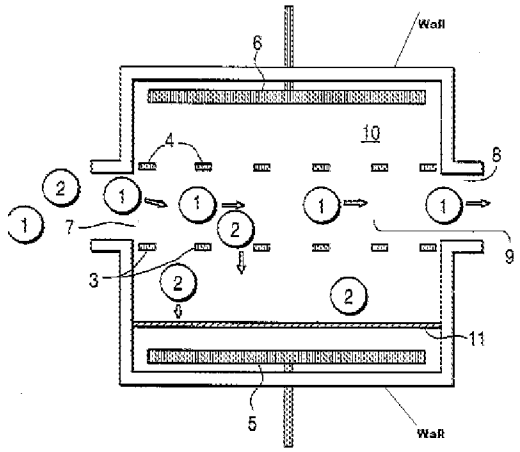
moving through the compartment a liquid in which particles (1 and 2) are suspended with a predetermined direction of flow (see col. 1, lines 11-15 and figure 1),

generating a deflection potential (electrophoretic effect) to move at least part of the particles (2) in the direction of deflection (see col. 5, lines 52-58 and figure 1),

one focusing potential (guiding field) to move at least part of the particles (1) opposite to the direction of deflection by dielectrophoresis under an effect of high-frequency electrical fields (see col. 5, lines 49-52, col. 3, lines 50-55 and see figure 1),

guiding particles with different dielectric properties into different flow areas (flow paths of particles 1 and 2) to separate particles (see col.1, lines 60-67 over to col. 2 and figure 2)

FIG. 1



Benecke et al. does not teach specifically a deflecting potential is formed by a direct voltage field.

However, Benecke et al. does teaches a homogenous field (electrophoretic force) is applied as the deflection force (see col. 2, lines 22-24). It is obvious to a person of ordinary skill in the art that a homogenous field can be a direct voltage and under applied field the particles are drawn to lateral walls of the compartment (see figure 1).

5. Regarding claim 2, direction of deflection (path of particles 2) is orthogonal to the direction of the flow (path of particles 1) (see figure 1).

6. Regarding claim 3, the direction of the deflection (path of particles 2) is orthogonal to the direction of the flow towards one of the plurality of lateral walls of the chamber (10), the deflecting potential is generated by electrical force, and flow areas comprises flow paths (flow paths of particles 1 and 2) corresponding to different

potential minima by applying focusing and deflection potentials during the passage through the channel under high-frequency alternating fields (see col. 1, lines 59-67 over to col. 2).

7. Regarding claim 7, Benecke et al. teaches that electrodes (22 and 28) are arranged along the walls of the channel (24) and electrodes (22) are loaded with electrical field for generating dielectrophoresis and electrodes (28) loaded with electrical field for generating electrophoresis (see col. 6, lines 1-18 and figure 2).

8. Regarding claims 10 and 11, Benecke et al. teaches an embodiment wherein plurality of focusing potentials are generated with electrode array (potentials generated by electrodes 22) between two electrodes (28) and the dielectric particles are guided onto separate flow paths (branch channels 27) (see figure 2)

9. Regarding claims 12 and 13, Benecke et al. teaches an embodiment wherein the two flow paths (flow paths of particles 1 and 2) empty into separated compartments (branch channels 27) separated by compartment wall (isolating layer 26) (see col. 6, lines 1-18 and figure 2).

10. Regarding claim 15, the particles (1 and 2) flow in front of the electrodes (3 and 4) during dielectrophoresis (see col. 3, lines 5-8 and figure 1).

11. Regarding claim 6, Benecke et al. does not teach specifically separation of particles occurs under direct voltage field.

However, Benecke et al. does teaches the method of separating mixture of microscopic particles such as biological cells and cell organelles under applied homogenous field (see col. 1, lines 1-20 and col. 2, lines 22-24), It is obvious to a person of ordinary skill in the art that a homogenous field can be a direct voltage.

12. Regarding claims 8 and 9, Benecke et al. does not teach specifically that the deflecting and focusing potentials are generated alternating in time.

However, Benecke et al. does indicate that the deflecting and focusing potentials are generated via high frequency alternating voltage along the channel (see col. 3, lines 48-67). Furthermore, Benecke et al. teaches a homogenous field (electrophoretic force) is applied as the deflection force (see col. 2, lines 22-24). Particle 2 is deflected out of the path by deflecting field and particle 1 moves along the flow (see figure 1), therefore it would be obvious to a person of ordinary skill in the art that both the deflecting and focusing potential are applied alternately to force the particles in different directions.

13. Regarding claim 14, Benecke et al. does not teach specifically that the direction of deflection force and focusing potentials are parallel to each other.

However, Benecke et al. teaches a homogenous field (electrophoretic force) is applied as the deflection force (see col. 2, lines 22-24 and figure 1), therefore the direction of deflection is parallel to direction of flow and several focusing potential

(dielectrophoresis force generated by row of electrodes 3 and 4) are parallel with direction of deflection (see figure 1), therefore it would be obvious to person of ordinary skill in the art that both the fields are superposed which would lead particles to run at different speeds.

14. Regarding claims 16 and 17, Benecke et al. does not teach specifically a pH gradient is generated in the channel by DC field.

However, Benecke et al. teaches a homogenous field is applied as the deflection force (see col. 2, lines 22-24), it is obvious to person of ordinary skill in the art a homogenous field can be a direct voltage and therefore it would be obvious to person of ordinary skill in the art that under applied homogenous field a pH gradient is generated in the channel.

15. Regarding claim 19, Benecke et al. does not teach specifically deflecting and focusing potentials are formed by superposed voltages.

However, Benecke et al. does teach that the deflecting (electrophoretic effect) and focusing (dielectrophoresis) potential are applied at alternating voltages with different frequencies (see col. 3, lines 57-61 and col. 4, lines 1-9). It is obvious to person of ordinary skill in the art that both the applied potentials are superposed in a chamber to move the particles (1 and 2) in two different directions.

16. Regarding claim 20, Benecke et al. does not teach specifically deflecting potentials are generated with different directions.

However, Benecke et al. teaches two deflection paths (branch channels 27) wherein the traveling field conveys the separated particles into the channels (see col. 6, lines 19-24) , therefore it is obvious to person of ordinary skill in the art that two deflecting potentials in different directions were applied to cause the particles to move in separate channels.

17. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benecke et al. (U.S. Pat. No. 5,454,472) as applied to claims 1-3, 10-13 and 15 above, and as further evidenced by Culbertson et al. (U.S. Pat. No. 6,783,647).

Regarding claim 5, Benecke et al. does not teach biological cells which are part lysed under direct voltage field.

However, Benecke et al. teaches the method of separating mixture of microscopic particles such as biological cells and cell organelles under applied homogenous field (see col. 1, lines 1-20 and col. 2, lines 22-24), it is obvious to person of ordinary skill in the art that a homogenous field can be a direct voltage.

Moreover, it is well known in the art, lysis of cells occur under applied electric field as further evidenced by Culberston et al. (see col. 2, lines 6-9) to examine content of cells and expedite screening of cellular responses to drugs (see col. 3, lines 54-61).

Therefore it would be obvious to lysate the cells under applied electric field to examine content of cells and expedite screening of cellular responses to drugs.

18. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Benecke et al. (U.S. Pat. No. 5,454,472) as applied to claims 1-3, 10-13 and 15 above, and further in view of Frumin et al. (U.S. Pub. No. 2001/0023825).

Regarding claim 18, Benecke et al. does not teach detection of particles take place after the guiding of the particles onto different flow paths.

However, Frumin et al. teaches a method of moving isolating and identifying particles under combined dielectrophoretic and electrophoretic field (see paragraph 0275) wherein the detection system detects the separated particles in different flow paths (see paragraph 0274 and figures 52C and 52D) in order to detect and extract cells in their respective flow paths.

Therefore it would be obvious to person of ordinary skill in the art at the time of the invention to incorporate the step of detecting the separated particles of Frumin et al. with the method of Benecke et al. to detect and extract cells in their respective flow paths.

Response to Arguments

Applicant's arguments filed 11/17/2009 have been fully considered but they are not persuasive.

Regarding amended claim 1 which now has claim limitations of cancelled claim 4, applicant argues Benecke fails to teach the deflecting potential being formed by direct voltage field. Examiner likes to reassert that Benecke teaches a homogenous field is applied as the deflection force (see col. 2, lines 22-24) and it is well known in the art a homogeneous field can be applied under direct voltage. Furthermore, Benecke

indicates that the additional field of forces action on the particles has the form of an electric field (see col. 2, lines 11-14) which further indicates a direct voltage field can be applied. Thus Benecke does teach claim limitations of amended claim 1.

Applicant further argues that Benecke does not disclose superposition of two deflection potentials. It is noted that the features upon which applicant relied to make an argument are not recited in the claim(s). Applicant claims a deflection potential and not superposition of two deflection potentials. Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Regarding applicant argument with respect to Benecke does not teach a second separation force, to examiner's best understanding of the argument, applicant is indicating that Benecke teaches only one type of force being used to separate particles. Examiner respectfully disagrees with applicant's argument. Benecke specifically teaches high-frequency alternating field is applied to force the particles to move them on a guide path and by applying additional field or force (second force) to move the particles out from the guide path. Thus two forces are applied which separates the particles in the channel.

Arguments regarding claims 2, 3 and 5-20 are moot based on their dependence on claim 1.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GURPREET KAUR whose telephone number is (571)270-7895. The examiner can normally be reached on Monday-Friday (Alternate Friday Off), 8:00-5pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on (571)272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For

more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nam X Nguyen/
Supervisory Patent Examiner, Art Unit 1753

/G. K./
Examiner, Art Unit 1795
2/19/2010